

DETAILED ACTION

Response to Arguments

Applicant's arguments, see pages 4, 5, filed 12/31/09, with respect to the rejection(s) of claim(s) 1, 4 that one of ordinary skill in the art would not combine Yamazaki with admitted prior art since Yamazaki's protrusion do not prevent deposition material from reaching the backside of substrate 1501 has been fully considered and is persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of admitted prior art in view of Homme et al (US 6,919,569) which when combined read on limitations of claims 1, 4. Accordingly claims 1, 4 and 8 have been rejected under 35 USC 103 (a) as explained below. Balance claims 2, 3 and 5-7, 9 have also been rejected under 35 USC 103 (a) as explained below. Additionally, claims 1, 4 have also been rejected under 35 USC 103 (a) over a new reference by Takagi (US 5,972,116). Further, claims 2, 5 have also been rejected under 35 USC 103 (a) as explained below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 4, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art in view of Homme et al (US 6,919,569).

Regarding Claims 1, 4, 8: Admitted prior art teach a method/apparatus for manufacturing a substrate by vapor deposition, comprising:

providing a substrate holder 1 above a source of deposition material, the substrate holder 1 including:

a first frame 2 for holding a substrate 3 of the plasma display panel, said first frame holding the substrate 3 has a protrusion extending from below a bottom surface of the substrate 3 along a side surface of the substrate without being superimposed over the top surface of the substrate; and

a second frame 2 having an opening 4, the protrusion between the substrate 3 and the opening 4 so that the substrate 3 is on one side of the protrusion and the opening 4 is on the other side of the protrusion and an unobstructed path exists from said source of deposition material (through the frame openings 4) to a top surface 3b of the said substrate 3;

providing the plasma display panel 3 which is held by the substrate holder 2 for deposition;

spraying said deposition material onto said bottom surface 3a of said substrate 3 from below the substrate [e.g. Figs. 9(a), 9 (b) and page 2, line 11 to page 3, line 5]. Further, the method shall obviously permit an additional amount of the deposition material to flow through opening 4 (where no substrate is installed) from below the substrate. Still further, since the method/apparatus enables deposition on the lower surface of the substrate, there would obviously be a source of deposition material below the substrate.

Admitted prior does not teach that the protrusion extends to a height above the substrate and is greater than a height of the substrate.

Homme et al teach an apparatus/method for deposition comprising:

A substrate holder for a solid state device for deposition on a substrate 1, the substrate holder being configured with a frame having a protrusion, the protrusion extending from below a bottom surface of the substrate 1 along a side surface of the substrate without being superimposed over the top surface of the substrate (e.g. Figs. 7, 8 and col. 4, lines 16-49).

Therefore it would have been obvious to one of ordinary skills in the art at the time of the invention to provide the protrusion in the substrate holder that extends to a height above the substrate and is greater than a height of the substrate as taught by Homme et al in the apparatus of admitted prior art to control any deposition products from depositing on the backside of the substrate.

Claims 2, 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art in view of Homme et al (US 6,919,569) as applied to claims 1, 4 and 8 and further in view of Meyyappan (US 2004/0083976).

Regarding Claims 2, 5: Admitted prior art in view of Homme et al teach the height of protrusion being greater than height of substrate but do not teach the height of protrusion is between 1-100 mm.

Meyyappan teaches a deposition apparatus and method for processing a substrate 26 wherein a ring 30 is provided (substrate support) around the substrate to prevent coating on backside of the substrate. Meyyappan further teaches that the ring 30 has an edge shielding portion 36 whose height is optimized to prevent the substrate from sliding-off the substrate support (Fig. 2 and para. 0008, 0012, 0016, 0021).

Therefore it would have been obvious to one of ordinary skills in the art at the time of the invention to optimize the height of the protrusion of the substrate holder as taught by Meyyappan in the method of admitted prior art in view of Homme et al to provide support to the substrate and control deposition on backside of the substrate.

In this connection the courts have ruled:

It would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable through routine experimentation in the absence of a showing of criticality. *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Claims 3, 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art in view of Homme et al (US 6,919,569) as applied to Claims 1 , 4, 8 and further in view of Hiroki et al (US 5,374,147).

Regarding Claims 3, 6: Admitted prior art in view of Homme et al teach all limitations of the claim including substrate holder (frame) 1 for holding substrate, but do not teach holding means including supporting means and positioning means.

Hiroki et al teach an apparatus and method for supporting a substrate 2 by a frame 73 and where the frame comprises support means 88 and positioning means (83, 84 with stoppers 85, 86) for positioning the substrate 2 in a planar direction, wherein the substrate is held by fitting the substrate to the positioning means (83-86) and placing the substrate on the support means 88 (e.g. Fig. 12 and col. 10, lines 13-63).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use frame with support means and positioning means as taught by Hiroki et al in the apparatus and method of Admitted prior art in view of Homme et al to ensure correct positioning of the substrate.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art in view of Homme et al (US 6,919,569) as applied to Claims 1, 4, 8 and further in view of Won et al (US 6,355,108).

Regarding Claim 7: Admitted prior art in view of Homme et al teach all limitations of the claim including first frame 1 for holding substrate, but do not teach first frame includes a plurality of tabs separated from each other which extend below the bottom surface of the substrate.

Won et al teach a deposition apparatus and method comprising a frame 22 with plurality of tabs 26. Won et al also teach that the tabs 26 support the substrate 28 on the deposition face and are shaped to accommodate the substrate 28, and comprise protruding contact surfaces for stabilizing a substrate on a support member during processing (e.g. Fig. 3, 4 and col. 5, line 25 to col. 6, line 35) [since applicant's specification does not explicitly describe any "tab", examiner has interpreted that the plurality of tabs as claimed refer to "Support 6a" in Fig. 6 – applicant is

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invited to confirm this]. Further, though, Won et al do not explicitly teach the tabs extend below the bottom surface of the substrate (during processing), the tabs 26 as taught by Won et al would obviously extend below the substrate in case frame 22 was used upside down with a deposition source disposed below the substrate.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the first frame with a plurality of tabs as taught by Won et al in the apparatus and method of Admitted prior art in view of Homme et al to stabilize the substrate on the frame during processing.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art in view of Homme et al (US 6,919,569) as applied to Claims 1, 4, 8 and further in view of Yang et al (US 6,397,776).

Regarding Claim 9: Admitted prior art in view of Homme et al teach all limitations of the claim except the protrusion curves away from the substrate.

Yang et al teach a method for deposition on a substrate comprising a two source array 15 for deposition on substrate 12. Yang et al further teach that a curved substrate holder is used for simulating curved surfaces for curved substrates (e.g. Fig. 1 and col. 10, lines 1-15). It would be obvious to use substrate holder with a protrusion that curves away from the substrate as per teaching of Yang et al to enable support substrates with curved surfaces.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the substrate holder with a protrusion that curves away from the substrate as taught by Yang et al in the apparatus and method of Admitted prior art in view of Homme et al to enable support substrates with curved surfaces.

Claims 1, 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi (US 5,972,116).

Regarding Claim 1: Takagi teaches a method of manufacturing a semiconductor device, the method comprising the steps of:

providing a substrate holder 6 below (above) a source of deposition material 2, the substrate holder including:

a first frame (comprising of arms 29 fixed on a shaft 28) for holding a substrate 8 of the semiconductor device, said first frame holding the substrate 8 has a protrusion 30 extending from above (below) a top (bottom) surface of the substrate along a side surface of the substrate 8 to a height below (above) the substrate and greater than a height of the substrate 8 without being superimposed below (over) the top (bottom) surface of the substrate; and

a second frame (comprising tubes 1a, 1b having an opening 4, the protrusion 30 between the substrate 8 and the opening 4 so that the substrate is on one side of the protrusion 30 and the opening 4 is on the other side of the protrusion and an unobstructed path exists from said source of deposition material 2 to a bottom (top) surface of said substrate 8;

providing the substrate 8 (plasma display panel) which is held by the substrate holder 6 for deposition;

spraying said deposition material (from source 2) onto said top (bottom) surface of said substrate from above (below) the substrate. Takagi also teach (Fig. 8) wherein the method/apparatus permits an additional amount of said deposition material to flow through said opening from above (below) the substrate (e.g. Figs. 1-3, 8). Further, use of terms “above” and “below” is relative and the prior art method/ apparatus could easily be rearranged to arrive at the claimed

method/apparatus. Further, the method and apparatus of prior art could be adapted for deposition on a plasma display panel.

Claims 2, 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi (US 5,972,116) applied to claims 1 and 4, and further in view of Meyyappan (US 2004/0083976).

Regarding Claims 2, 5: Takagi teaches the height of protrusion being greater than height of substrate but do not teach the height of protrusion is between 1-100 mm.

Meyyappan teaches a deposition apparatus/ method for processing a substrate 26 wherein a ring 30 is provided (substrate support) around the substrate to prevent coating on backside of the substrate. Meyyappan further teaches that the ring 30 has an edge shielding portion 36 whose height is optimized to prevent the substrate from sliding-off the substrate support (Fig. 2 and para. 0008, 0012, 0016, 0021).

Therefore it would have been obvious to one of ordinary skills in the art at the time of the invention to optimize the height of the protrusion of the substrate holder as taught by Meyyappan in the method/aparatus of Takagi to provide support to the substrate and control deposition on backside of the substrate.

In this connection the courts have ruled:

It would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable through routine experimentation in the absence of a showing of criticality. *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Conclusion

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to RAKESH DHINGRA whose telephone number is (571)272-5959. The examiner can normally be reached on 8:30 - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. D./

Examiner, Art Unit 1792

/Karla Moore/

Primary Examiner, Art Unit 1792